

Figure 1a

09364345, 054401
T04250, 5449850

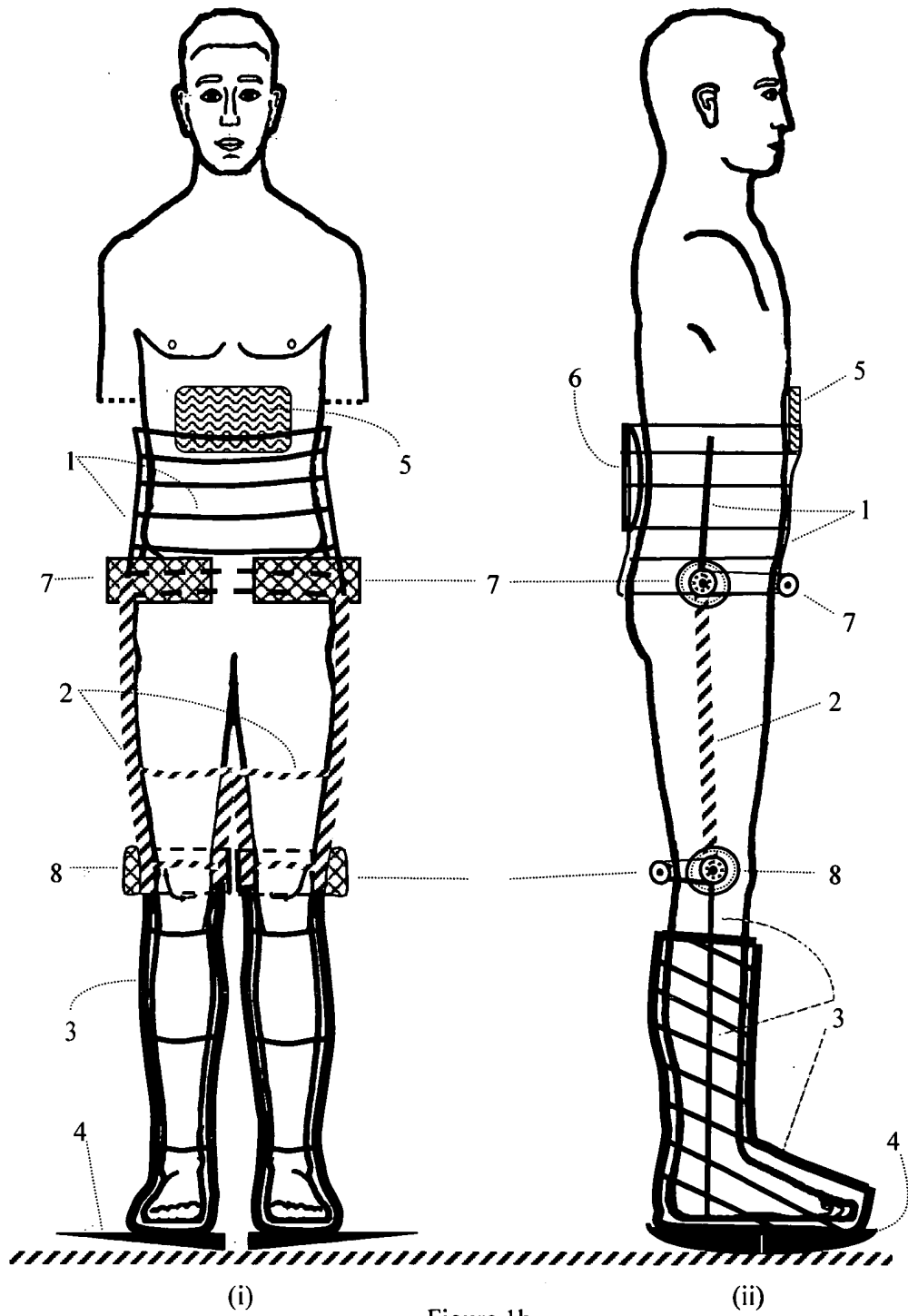


Figure 1b

Diagram illustrating a leg in a bent position, showing various components and joints:

- 100**: Arrow pointing to the upper leg assembly.
- 102**: Vertical line representing the trunk or support.
- 104**: Vertical line representing the upper leg.
- 106**: Joint or connection point between the upper leg and the lower leg.
- 108**: Joint or connection point between the upper leg and the lower leg.
- 110**: Joint or connection point between the upper leg and the lower leg.
- 112**: Lower leg segment.
- 114**: Joint or connection point between the lower leg and the foot.
- 116**: Joint or connection point between the lower leg and the foot.
- 118**: Joint or connection point between the lower leg and the foot.
- trunk**: Label for the vertical line 102.
- hip**: Label for the joint 116.
- knee**: Label for the joint 118.
- leg**: Label for the lower leg segment 112.

A schematic diagram of a leg assembly. A vertical line 102 represents the torso. A hip joint 116 is located at the intersection of the torso and a thigh segment 112. A knee joint is located further down the thigh segment. A dashed line 114 extends from the knee joint, representing the lower leg. A foot 118 is attached to the end of the lower leg. A vertical line 150 is positioned to the right of the hip joint. A rectangular component 152 is attached to the vertical line 150 at a point 154. An arrow points from the component 152 towards the hip joint 116.

Figure 2b

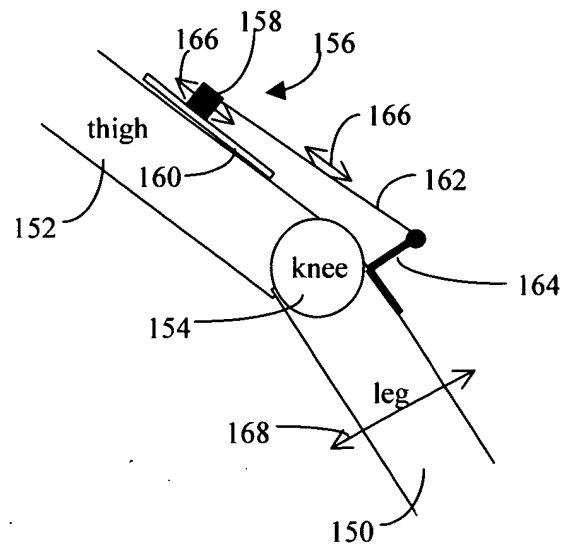


Figure 3a

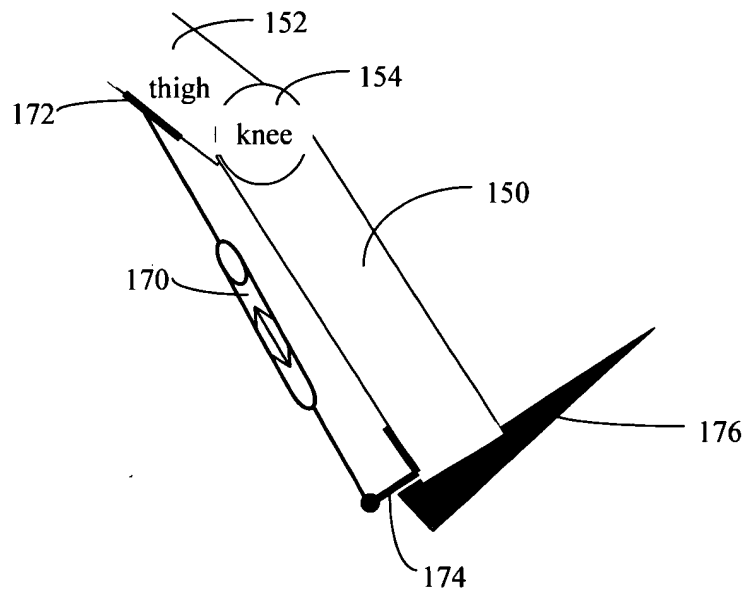


Figure 3b

US 4,340,101 A

Figure 4

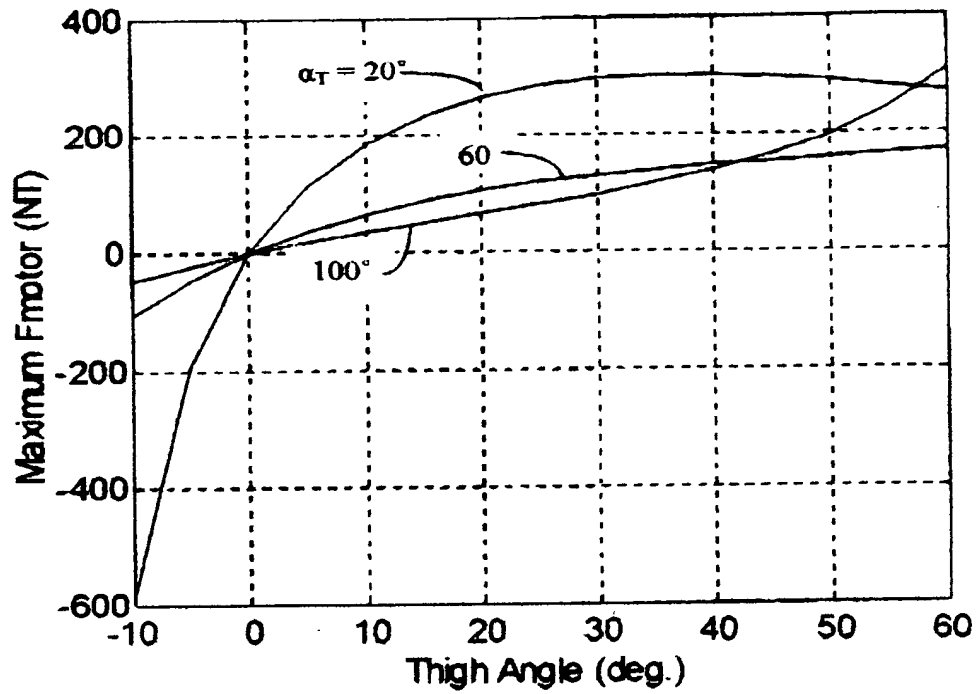


Figure 5a

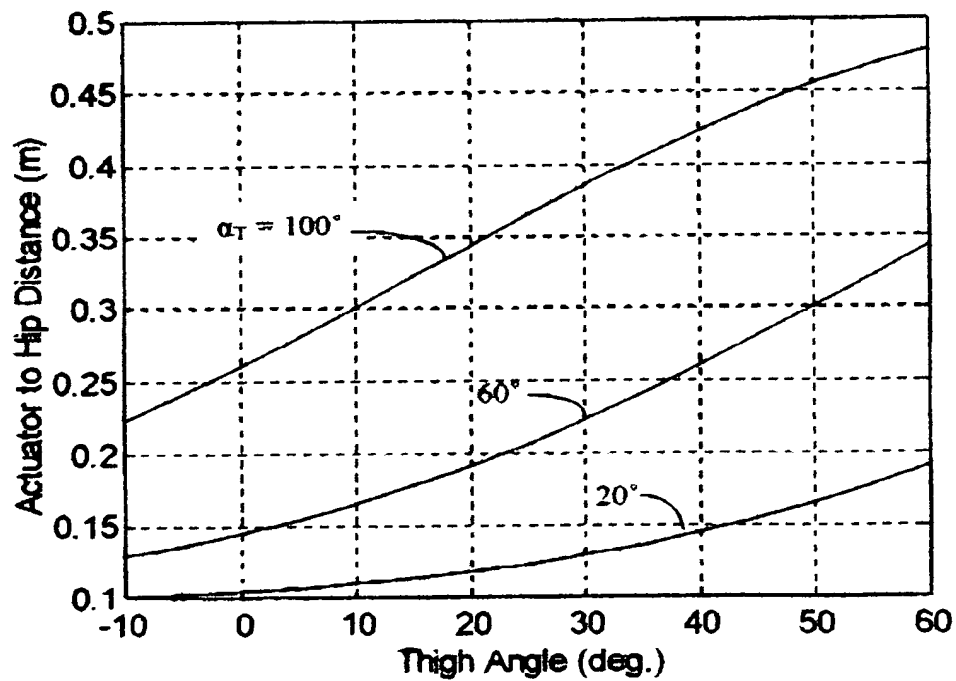


Figure 5b

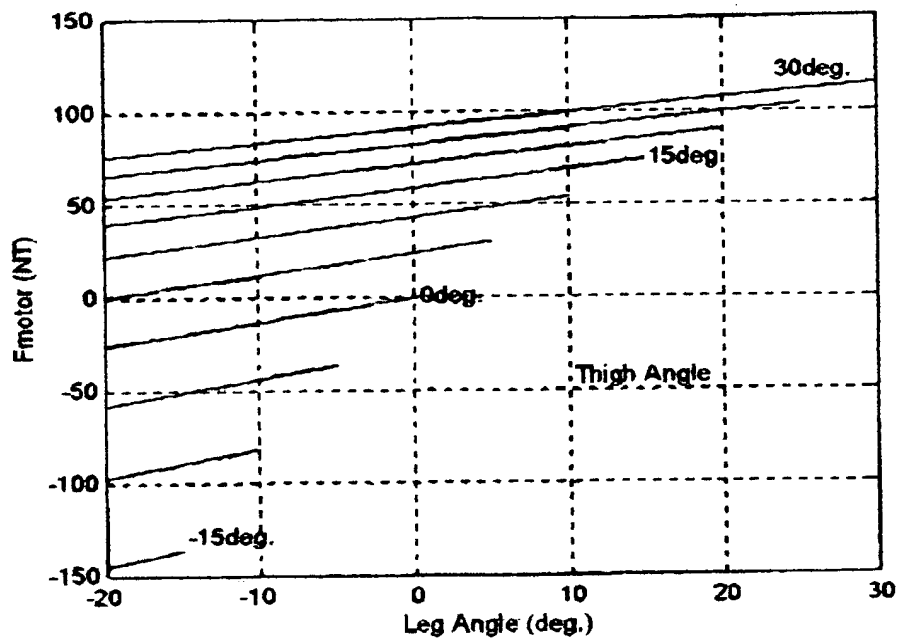


Figure 6

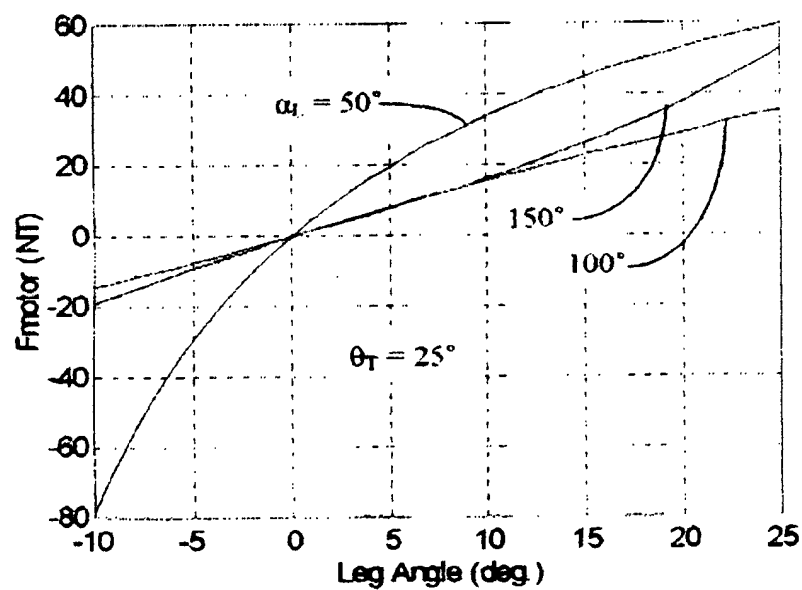


Figure 7a

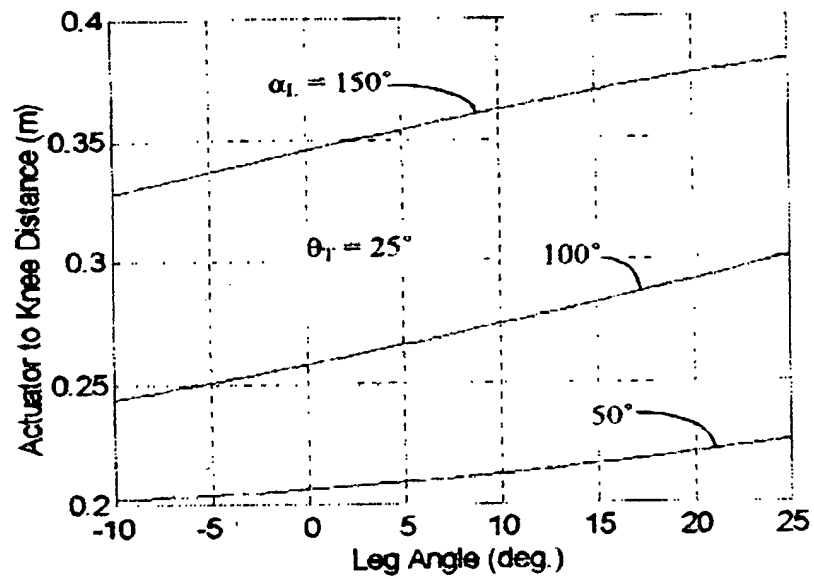


Figure 7b

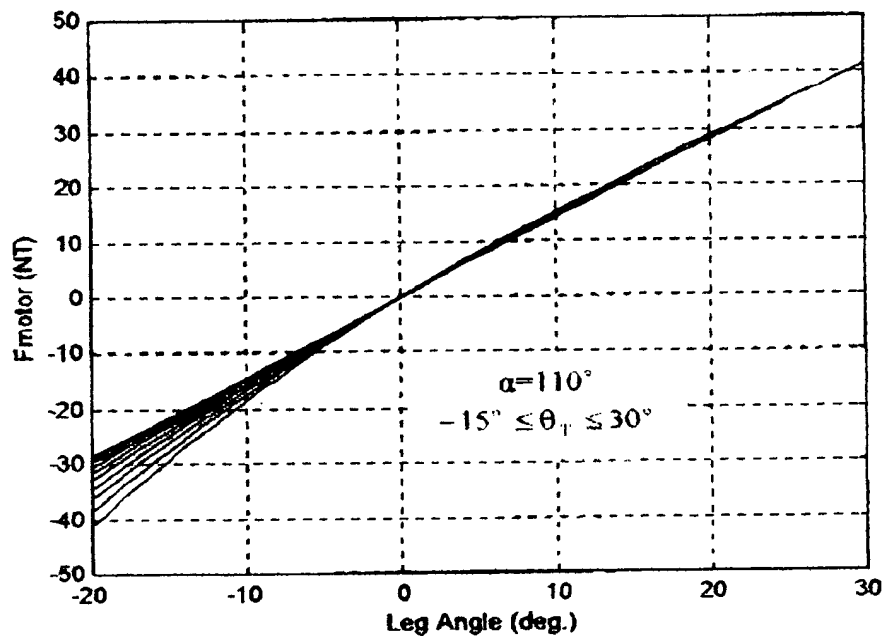


Figure 8

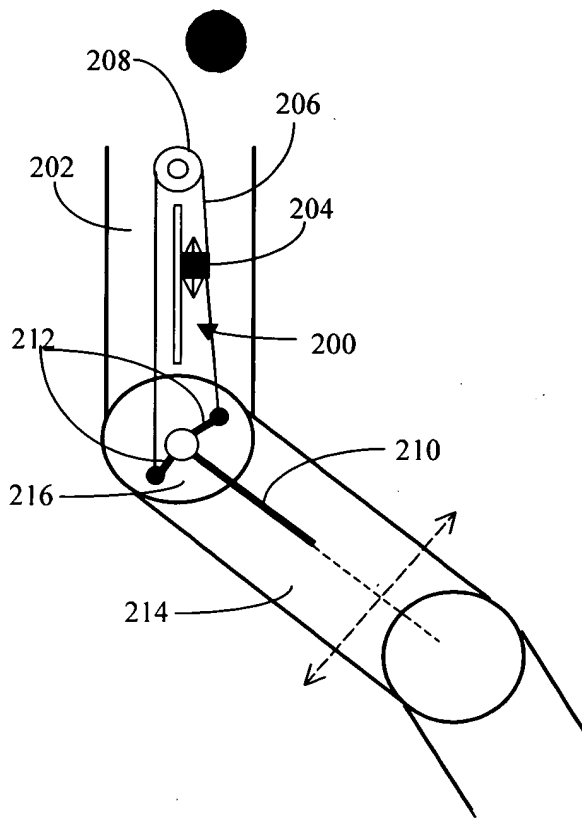


Figure 9a

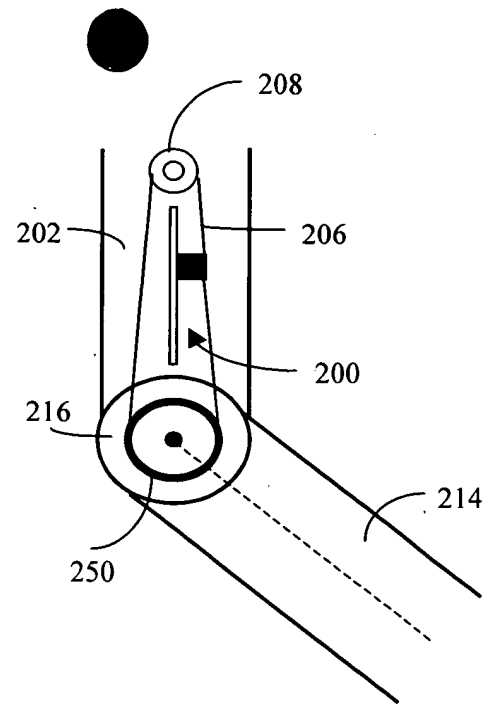


Figure 9b

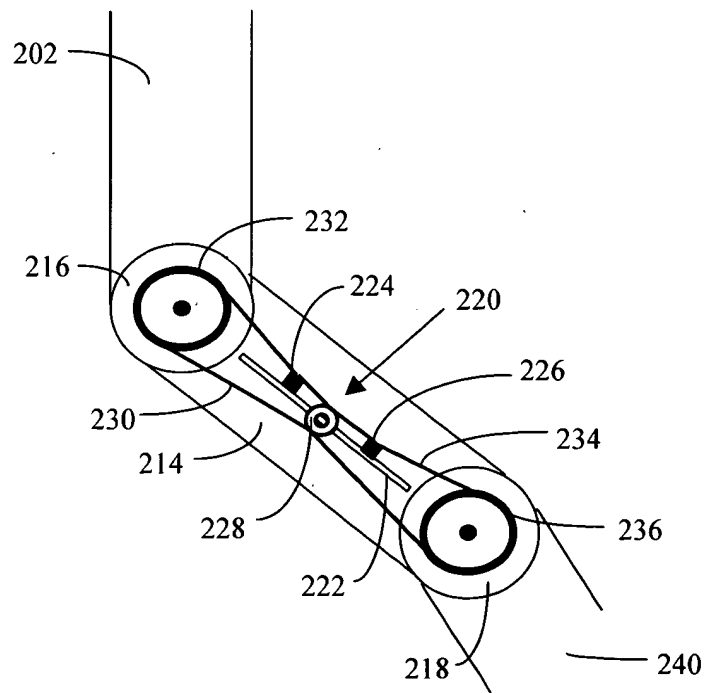


Figure 9c

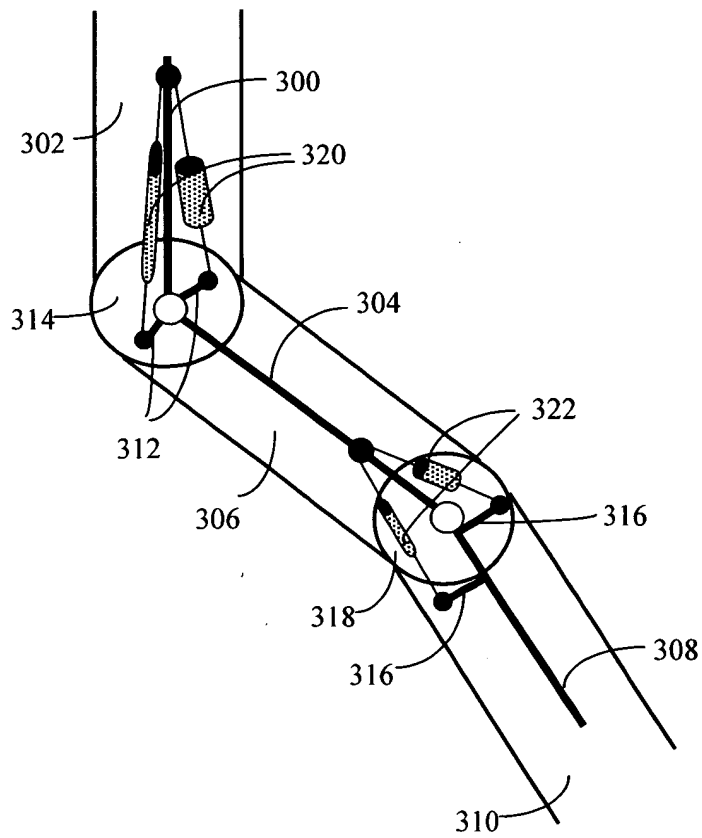


Figure 10

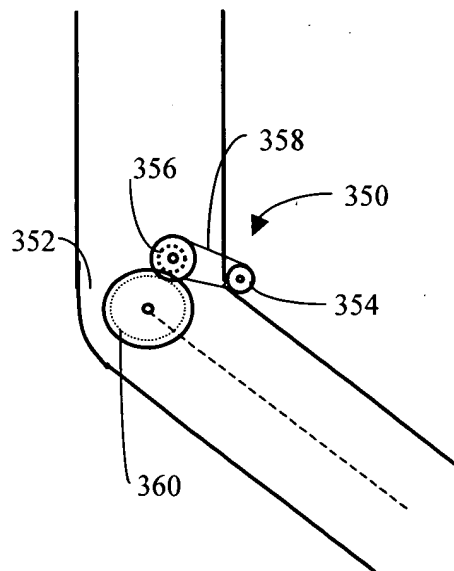


Figure 11a

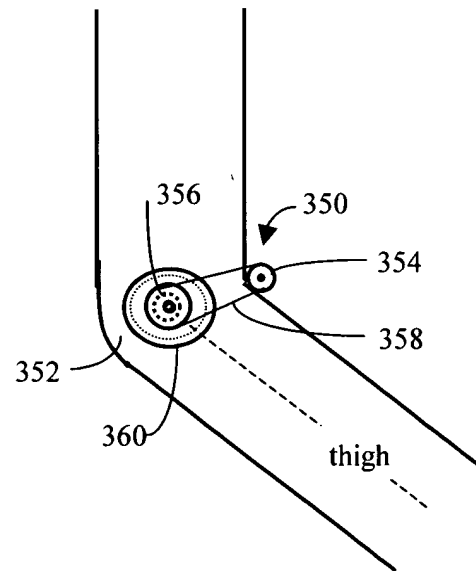
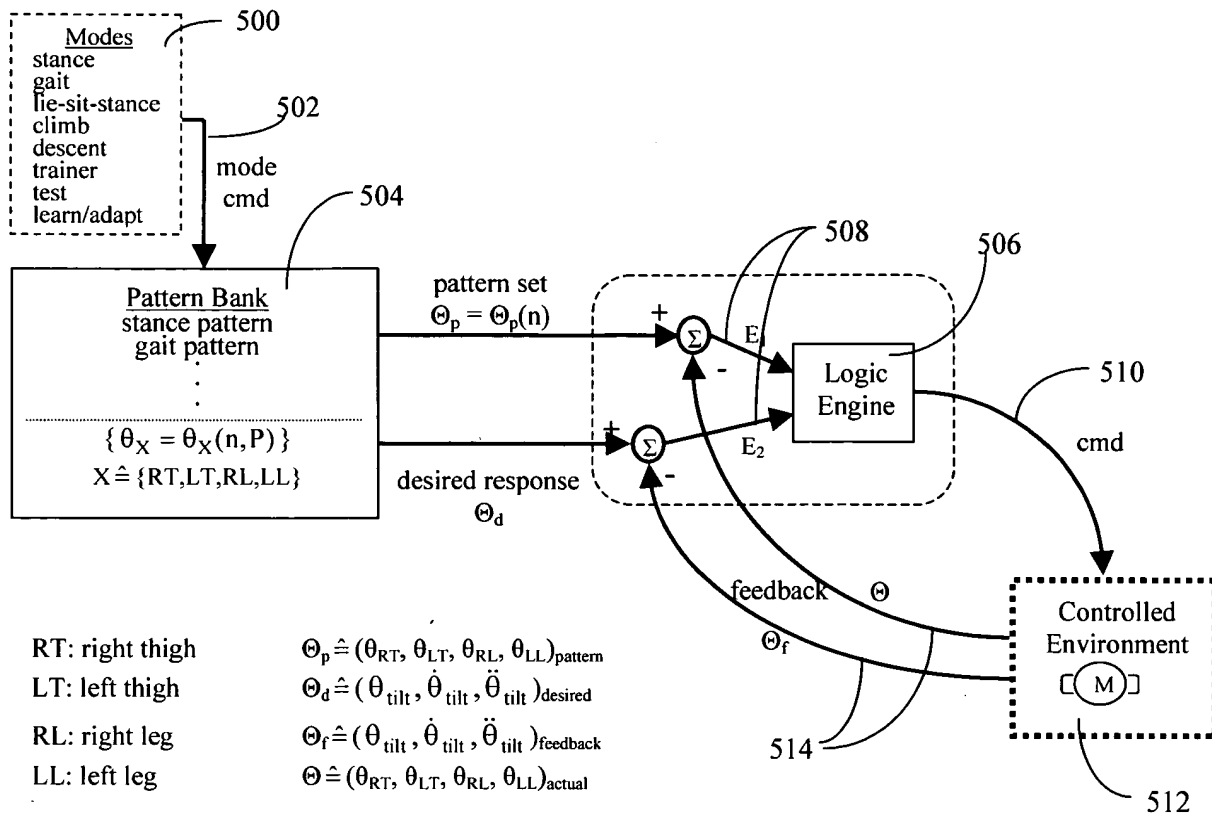


Figure 11b



RT: right thigh
 LT: left thigh
 RL: right leg
 LL: left leg

$\Theta_p \triangleq (\theta_{RT}, \theta_{LT}, \theta_{RL}, \theta_{LL})_{\text{pattern}}$
 $\Theta_d \triangleq (\theta_{\text{tilt}}, \dot{\theta}_{\text{tilt}}, \ddot{\theta}_{\text{tilt}})_{\text{desired}}$
 $\Theta_f \triangleq (\theta_{\text{tilt}}, \dot{\theta}_{\text{tilt}}, \ddot{\theta}_{\text{tilt}})_{\text{feedback}}$
 $\Theta \triangleq (\theta_{RT}, \theta_{LT}, \theta_{RL}, \theta_{LL})_{\text{actual}}$

Figure 12

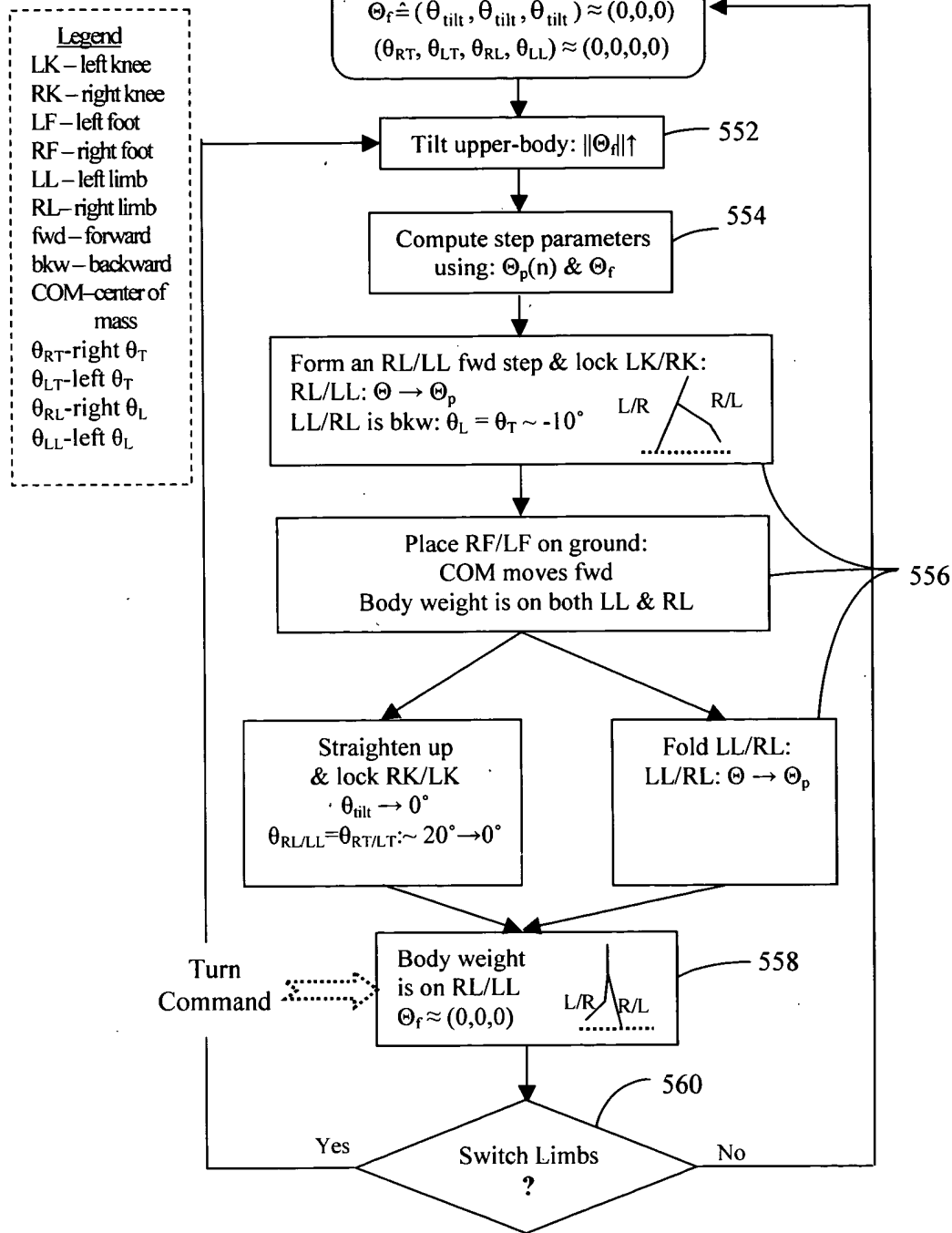


Figure 13

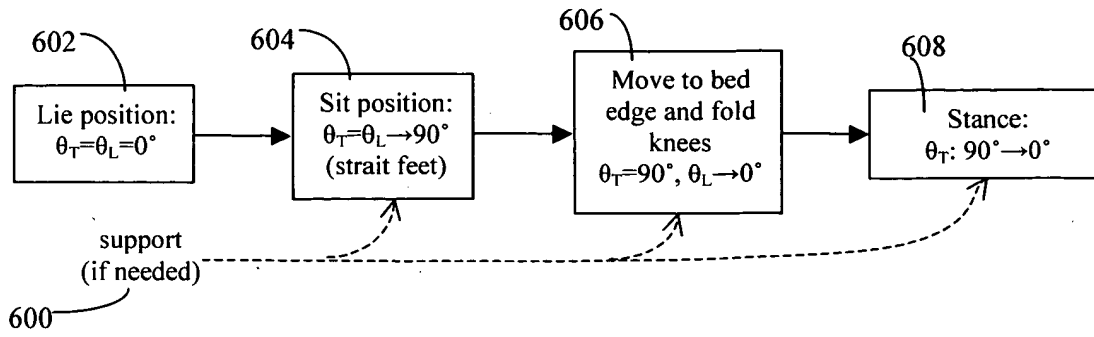


Figure 14

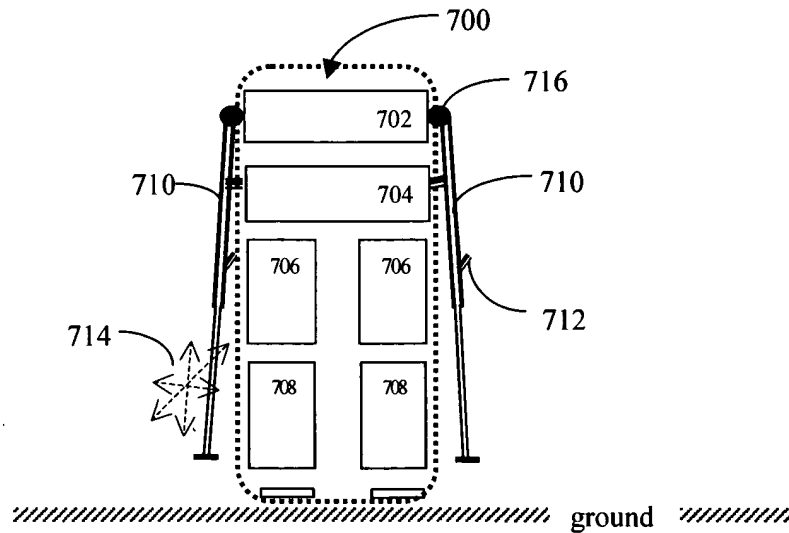


Figure 15

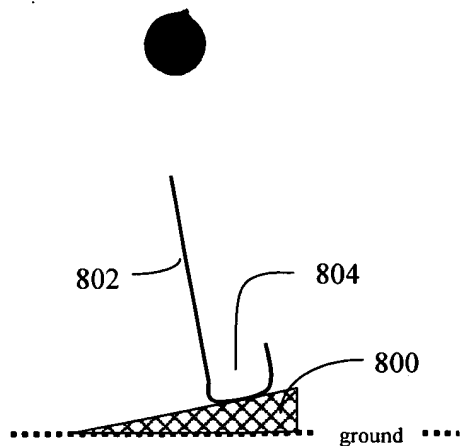


Figure 16a

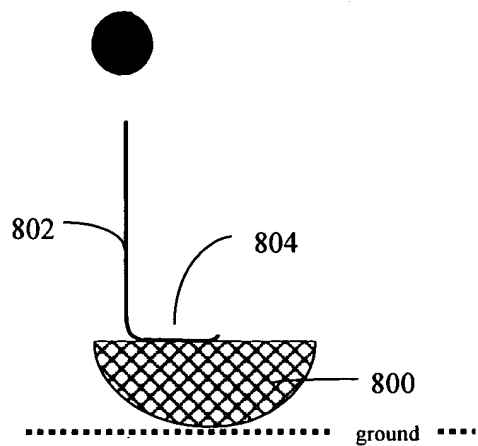


Figure 16b

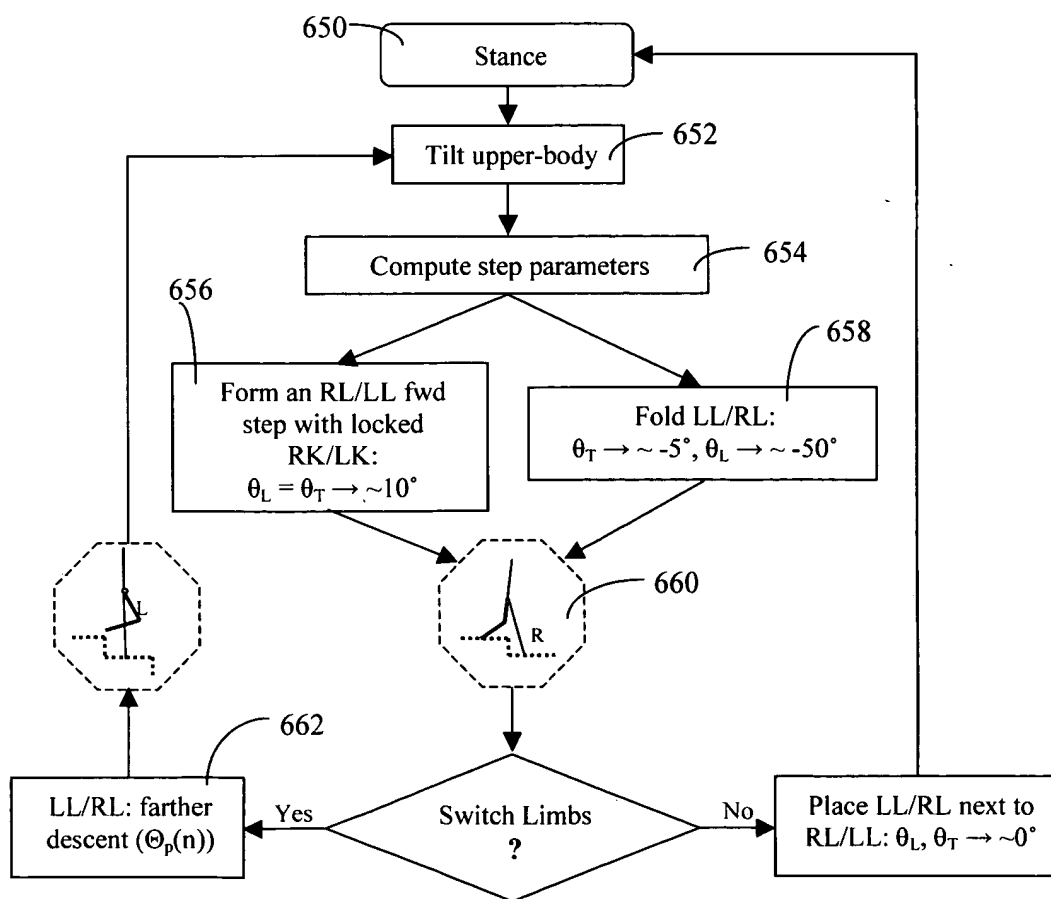


Figure 17

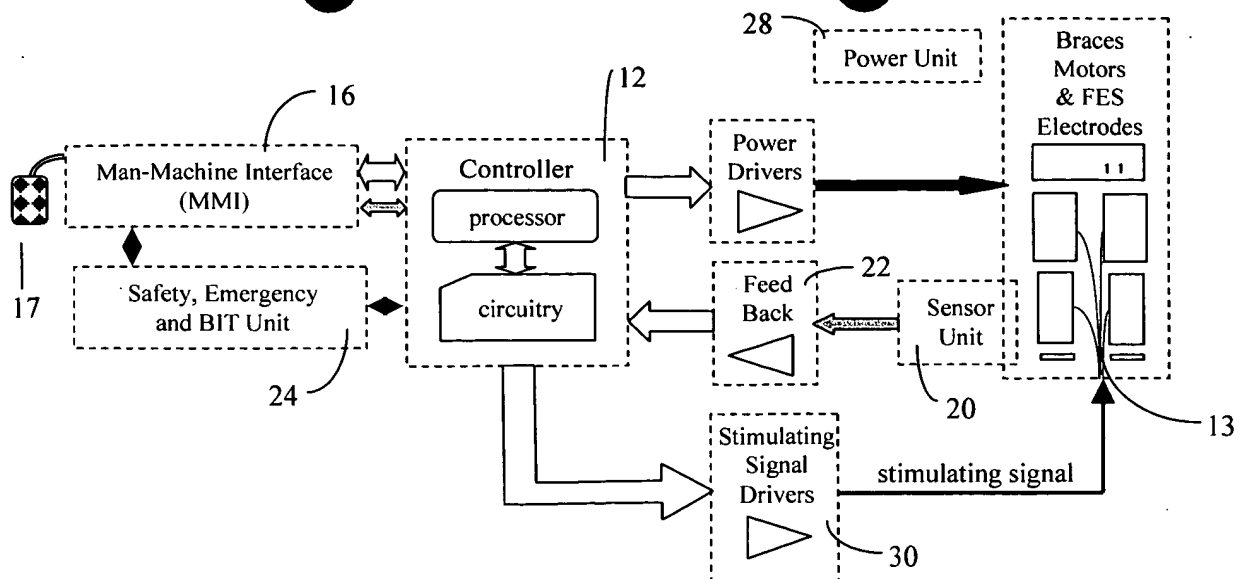


Figure 18

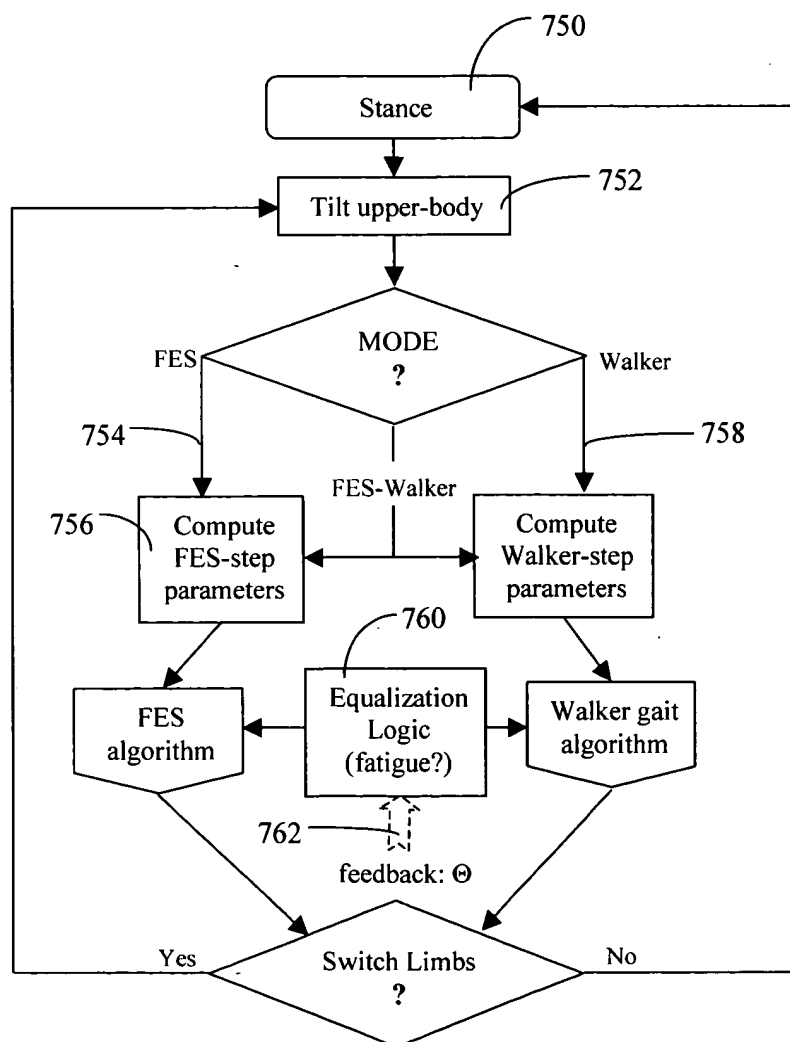


Figure 19

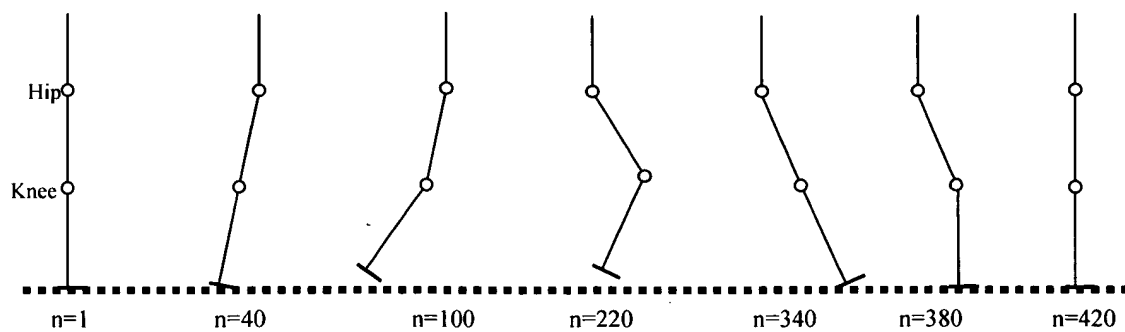


Figure 20

20250404 14:30:00